## REMARKS

Claims 1-25 remain pending. Applicants respectfully request continued prosecution of this application. A petition for a one-month extension of time in which to respond accompanies this document. A terminal disclaimer accompanies this document to overcome the Examiner's provisional rejection of obviousness-type double patenting over Claims 1-25 of copending Application No. 09/918930. Applicants have amended Claims 17 and 18 to overcome the Examiner's rejection under *35 U.S.C. 112* (*Second Paragraph*). Claim 25 has been cancelled to overcome the Examiner's rejection under *35 U.S.C. 102*. Applicants have amended Claims 1, 2, 11 and 19 for the purposes of clarity, and in making the amendments Applicants have not narrowed the scope of the claims, nor intend to surrender any patentable subject matter. In addition to the foregoing amendments, this paper more particularly responds to the Office Action mailed November 2, 2002 as follows:

### I. The Rejection of Claims 17 and 18 under *35 U.S.C. 112*

The Examine rejected Claims 17 and 18 under *35 U.S.C. 112* for insufficient antecedent basis. Applicants have amended Claims 17 and 18 to overcome the rejection, and therefore respectfully request the Examiner to withdraw the rejection of Claims 17 and 18 under *35 U.S.C. 112*. In amending Claims 17 and 18, Applicants have not narrowed the scope of the claims, nor intend to surrender any patentable subject matter.

### II. The Provisional Rejection of Double Patenting

The Examiner provisionally rejected Claims 1-25 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1-25 of copending Application No. 09/918930. Pursuant to the Examiner's suggestion, Applicants respectfully submit the attached terminal disclaimer to overcome the Examiner's provisional rejection. As such, the Applicants respectfully request the Examiner to withdraw the provisional rejection of obviousness-type double patenting over Claims 1-25 of copending Application No. 09/918930.

### III. The Rejection of Claims 25 under *35 U.S.C. 102* over *Kaneko*

In the Office Action, the Examiner rejected Claims 25 under *35 U.S.C. 102* as being anticipated by *Kaneko*. Claim 25 has been cancelled to overcome the Examiner's rejection.

## IV. The Rejection of Claims 1-24 under 35 U.S.C. 103 over *Alexander (USPN 6,024,865)* in view of *Alexander (USPN 6,059,962)*

The Examiner rejected Claims 1-24 under *35 U.S.C. 103(a)* as being unpatentable over *Alexander (USPN 6,024,865; hereinafter the '865 patent)* in view of *Alexander (USPN (6,059,962; hereinafter the '962 patent).* Applicants respectfully traverse the Examiner's rejection.

As previously stated, Applicants' Claim 1 comprises the steps of: (1) passing a feedstock through a bed of solid adsorbent, producing an effluent with reduced nitrogen; (2) contacting the effluent at elevated temperatures with an acidic catalyst to convert sulfur impurities in the effluent to a higher molecular weight through an alkylation process, producing an initial product stream; and (3) contacting at least a portion of the initial product stream at temperatures at least 10°C lower than an average of the elevated temperatures in the first contacting stage with an acidic catalyst to convert sulfur impurities in the initial product stream to a higher molecular weight through an alkylation process, thereby forming a subsequent product stream.

The *'865 patent* teaches a sulfur removal process comprising the steps of: (1) separating a feedstock having sulfur-containing aromatic compounds by fractional distillation into a lower boiling fraction that contains the more volatile sulfur-containing aromatic impurities and at least one higher boiling fraction that contains the less volatile sulfur-containing aromatic impurities; (2) separately subjecting each fraction to reaction conditions that are effective to convert at least a portion of its content of sulfur-containing aromatic impurities to higher boiling point sulfur-containing products by alkylation with an alkylating agent in the presence of an acidic catalyst; and (3) removing the higher boiling sulfur-containing products by fractional distillation. The *'865 patent* also teaches that alkylation can be achieved in stages provided that the conditions of alkylation are less severe in the initial alkylation stage than in a secondary stage, e.g., through the use of a lower temperature in the first stage as opposed to a higher temperature in a secondary stage. (*See the '865 patent at col.8, lines 56-60; col. 9, lines 13-24*).

The *'962 patent* teaches a multiple stage sulfur removal process comprising the steps of: (1) subjecting a feedstock having sulfur-containing aromatic compounds to alkylation conditions which are effective to convert a portion of the impurities to higher boiling sulfur-containing products; (2) separating the resulting products by fractional distillation into a lower boiling fraction and a higher boiling fraction; (3) subjecting the higher boiling sulfur-containing fraction to alkylating conditions that are effective to convert at least a portion of its content of sulfur containing aromatic compounds to higher boiling sulfur-containing products; and (4) separating

the resulting products by fractional distillation into a lower boiling fraction and a higher boiling fraction. Like the *'865 patent*, the *'962 patent* teaches that alkylation can be achieved in stages provided that the conditions of alkylation are less severe in the initial alkylation stage than in a secondary stage, e.g., through the use of a lower temperature in the first stage as opposed to a higher temperature in a secondary stage. (*See the '962 patent at col.8, lines 56-60; col. 9, lines 13-24*).

Applicants respectfully submit that the cited references when combined teach away from Claims 1-25 of Applicants' invention. As correctly pointed out by the Examiner and contrary to Applicants' claimed invention, neither the *'865 patent* or the *'962 patent* disclose (or suggest) a second contacting stage at temperatures at least 10°C lower than an average of the elevated temperatures in the first contacting stage. (*See Office Action at pg. 7, lines 3-4*). However, the Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a first contacting stage at elevated temperatures and a second contacting stage at temperatures at least 10 C lower than an average of the elevated temperatures in the first contacting stage because *the '865 patent* discloses utilization of these stages under effective conditions. (*See Office Action at pg. 9, lines 1-5*). The Examiner's assertion is incorrect.

The *'865 patent* and the *'962 patent* teaches that alkylation can be achieved in stages provided that the conditions of alkylation are less severe in the initial alkylation stage than in a secondary stage, e.g., through the use of a lower temperature in the first stage as opposed to a higher temperature in a secondary stage. (*See the '865 patent at col.8, lines 56-60; col. 9, lines 13-24*; *See the '962 patent at col.8, lines 56-60; col. 9, lines 13-24*). Consequently, the *'865 patent* and the *'962 patent* clearly teach away from Applicants' invention, which recites the use of lower temperatures in a secondary stage as opposed to higher temperatures in a first alkylation stage.

In view of the foregoing, Applicants respectfully submit that the cited references are insufficient to support a *prima facie* case of obviousness against Claims 1-24 of Applicants' invention. As such, Applicants' respectfully request the Examiner to withdraw the rejection of Claims 1-24 under *35.U.S.C. 103* over *Alexander* in view of *Alexander*.

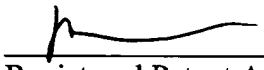
## V. Final Remarks

Marked-up versions of Claims 1, 2, 11, 17 and 19 using the bracket and underlining method is attached to this document to show the changes made by the foregoing amendments. Applicants' submit that this document is fully responsive to the Office Action mailed November 06, 2002 and that Claims 1-24 are in condition for allowance. If the Examiner has any question

regarding this paper, the Examiner is encouraged to contact Applicants' attorney at the Examiner's convenience.

The Commissioner for Patents is authorized to withdraw any additional fees required in connection with this Amendment and Response from Deposit Account No. 01-0528.

Respectfully submitted,



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## VERSIONS WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) A process for the production of products which are liquid at ambient conditions and contain organic sulfur compounds of higher molecular weight than corresponding sulfur-containing compounds in the feedstock, which process comprises:

providing a feedstock comprising a mixture of hydrocarbons which includes olefins, and sulfur-containing organic compounds and nitrogen-containing organic compounds, the feedstock consisting essentially of material boiling between about 60° C. and about 345° C. and having a sulfur content up to about 4,000 or 5,000 parts per million and a nitrogen content up to about 2,000 parts per million;

passing the feedstock through a bed of solid adsorbent, under conditions suitable for adsorption within the bed, to effect selective adsorption and/or complexing of at least a portion of the contained nitrogen-containing organic compounds with the adsorbent, and thereby obtain effluent from the bed which contains less nitrogen-containing organic compounds than the feedstock;

in a first contacting stage at elevated temperatures, contacting the effluent with an acidic catalyst under conditions which are effective to convert a portion of the [impurities] sulfur-containing organic compounds to a sulfur-containing material of higher molecular weight through alkylation by the olefins, thereby forming an initial product stream; and

in a subsequent contacting stage and at temperatures at least 10 C lower than the average of the elevated temperatures in the first contacting stage, contacting at least a portion of the initial product stream with an acidic catalyst under conditions which are effective to convert a portion of the [impurities] sulfur-containing organic compounds to a sulfur-containing material of higher molecular weight through alkylation by the olefins, thereby forming a subsequent product stream.

2. (Amended) The process of claim 1 wherein the [petroleum] feedstock is comprised of a naphtha from a catalytic cracking process and/or a thermal cracking process.

11. (Amended) A process for the production of products which are liquid at ambient conditions and have a reduced content relative to the feedstock, which process comprises:

providing a feedstock comprising a mixture of hydrocarbons which includes olefins, nitrogen containing organic compounds and sulfur-containing organic compounds and nitrogen-containing organic compounds, the feedstock consisting essentially of material boiling between

about 60° C. and about 345° C. and having a sulfur content up to about 4,000 or 5,000 parts per million;

passing the feedstock through a bed of solid adsorbent, under conditions suitable for adsorption within the bed, to effect selective adsorption and/or complexing of at least a portion of the contained nitrogen-containing organic compounds with the adsorbent, and thereby obtain effluent from the bed which contains less nitrogen-containing organic compounds than the feedstock;

in a first contacting stage at elevated temperatures, contacting the effluent with an acidic catalyst under conditions which are effective to convert a portion of the [impurities] sulfur-containing organic compounds to a sulfur-containing material of higher molecular weight through alkylation by the olefins, thereby forming an initial product stream;

in a subsequent contacting stage and at temperatures at least 10 C lower than the average of the elevated temperatures in the first contacting stage, contacting at least a portion of the initial product stream with an acidic catalyst under conditions which are effective to convert a portion of the [impurities] sulfur-containing organic compounds to a sulfur-containing material of higher molecular weight through alkylation by the olefins, thereby forming a subsequent product stream; and

fractionating the subsequent product stream by distillation to provide at least one low boiling fraction consisting of a sulfur-lean, fraction having a sulfur content less than about 50 ppm, and a higher-boiling fraction consisting of a sulfur-rich, fraction containing the balance of the sulfur.

17. (Amended) The process of claim [8] 11 wherein [the] at least one low-boiling fraction has a distillation end point and the high-boiling fraction has an initial boiling point such that the distillation end point and the initial boiling point are in the range from about 80° C to about 220° C.

18 (Amended) The process of claim [8] 11 wherein the high-boiling fraction has a distillation end point which is below about 249° C.

19. (Amended) A process for the production of products which are liquid at ambient conditions and contain organic compounds of higher molecular weight than corresponding sulfur-containing compounds in the feedstock, which process comprises:

providing a feedstock comprising a mixture of hydrocarbons which includes olefins, nitrogen containing organic compounds and sulfur-containing organic compounds and nitrogen-containing organic compounds, the feedstock consisting essentially of material boiling between

about 60° C. and about 345° C. and having a sulfur content up to about 4,000 or 5,000 parts per million;

passing the feedstock through a bed of solid adsorbent, under conditions suitable for adsorption within the bed, to effect selective adsorption and/or complexing of at least a portion of the contained nitrogen-containing organic compounds with the adsorbent, and thereby obtain effluent from the bed which contains less nitrogen-containing organic compounds than the feedstock;

in a first contacting stage at elevated temperatures, contacting the effluent with an acidic catalyst under conditions which are effective to convert a portion of the [impurities] sulfur-containing organic compounds to a sulfur-containing material of higher molecular weight through alkylation by the olefins, thereby forming an initial product stream;

in a subsequent contacting stage and at temperatures at least 10 C lower than the average of the elevated temperatures in the first contacting stage, contacting at least a portion of the initial product stream with an acidic catalyst under conditions which effective to convert a portion of the [impurities] sulfur-containing organic compounds to a sulfur-containing material of higher molecular weight through alkylation by the olefins, thereby forming a subsequent product stream;

fractionating the subsequent product stream by distillation to provide at least one low boiling fraction consisting of a sulfur-lean, fraction having a sulfur content less than about 50 ppm, and a higher-boiling fraction consisting of a sulfur-rich, mono-aromatic-lean fraction containing the balance of the sulfur;

treating the high-boiling fraction with a gaseous source of dihydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst which exhibits a capability to enhance the incorporation of hydrogen into one or more of the sulfur-containing organic compounds and under conditions suitable for hydrogenation of one or more of the sulfur-containing organic compounds; and

recovering a high-boiling liquid having a sulfur content less than about 50 ppm.